Snare-marking chamois in New Zealand

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Abstract

Tested self-attaching collars for snare-marking chamois to determine individual movements, movement patterns, range use and population turnover between 1973 and 1977 in a study region of the Southern Alps of New Zealand. Three hundred and eighty self-marking snares were set in rugged bluffs and forest, sited in 15 lines of 15—40 snares each, distributed over a 75 km² area. Snares comprised interlocking stainless steel snap-lock clip and sliding ring and hollow braid collar, rope collar and polythene anchor cord. Brightly coloured PVC tags tied to collars enabled identification of the animals marked. Steel rods, galvanised wire and plastic coated wire were used to support snares in exposed treeless sites. Two hundred and eighty-six collars were taken and about 220 chamois were marked. Results indicate that approximately even proportions of male, female, juvenile and adult animals were marked, although different proportions of each were tagged during summer and winter seasons. Movements of up to 42 map km by marked individuals have occurred.

Introduction

Free-ranging chamois *(Rupicapra rupicapra)* are difficult to capture because of their physical attributes, alertness, and preference for mountain habitat. During a study of population, movements, and range use of chamois various attempts were made to capture and mark the animals. Techniques used were trapping in pens, hunting with a „Paxarms" tranquiliser gun (Murdoch 1971), netting from a helicopter, and setting self-attaching collars (Taylor 1969). However, the use of self-attaching collars was the only method that resulted in significant numbers of animals being marked. This paper describes the technique used to mark chamois and gives some preliminary results.

Study area and population

The study area is a rugged mountain region of about 250 km² and comprises the tributary catchments of the Avoca and Wilberforce Rivers in Canterbury Province, South Island, New Zealand (Fig. 1). The land rises steeply the rivers (600 m a.s.l.) to the ridges (1900—2200 m) which form part of the Southern Alps mountain chain. Extensive screes and erosion surfaces dominate the alpine zone and extend down through the forest *(Nothofagus* spp.) to the streams. Alpine grasslands and herbfields are scattered between bluffs and screes, extending upwards from the timberline at 1500 m to about 2000 m.

Climate in the region is predominantly warm and windy in summer, but cool with frost and snow in winter. Air temperatures recorded at the timberline range from −7°C to 29°C. Snow lies above the timberline between April and November and snowfalls may occur in any month of the year. Annual precipitation is about 2000 mm. Figure 2 shows Basin Creek, a central study catchment of the Avoca River, during late winter.

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Chamois were liberated in 1907 at Mt. Cook (43°34S 170°07E) and colonised the study area about 1925. Within the study area they occupy a wide range of habitats, but occur most frequently in bluffs and herbfields about the timberline and in the upper forested zone. The population density averages about one chamois per 25 hectares. Together with red deer *(Cervus elaphus),* which also occur in the study area, ungulate biomass is approximately one animal per 15 hectares.

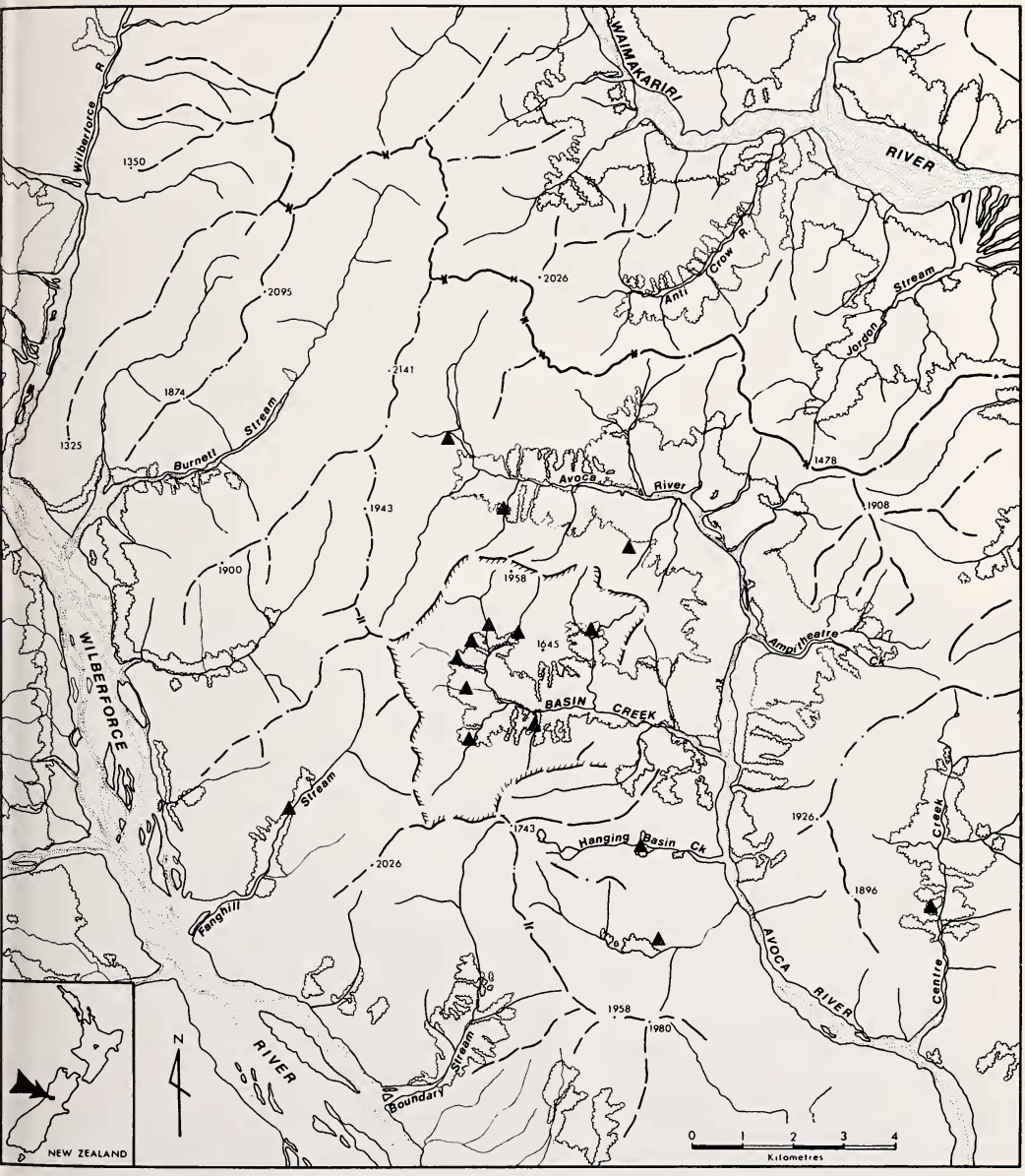

Fig. 1. The study area with location map inset. Basin Creek, a central study catchment and centre-point for chamois studies, is shown outlined. Snare lines described in the text are designated by solid triangles

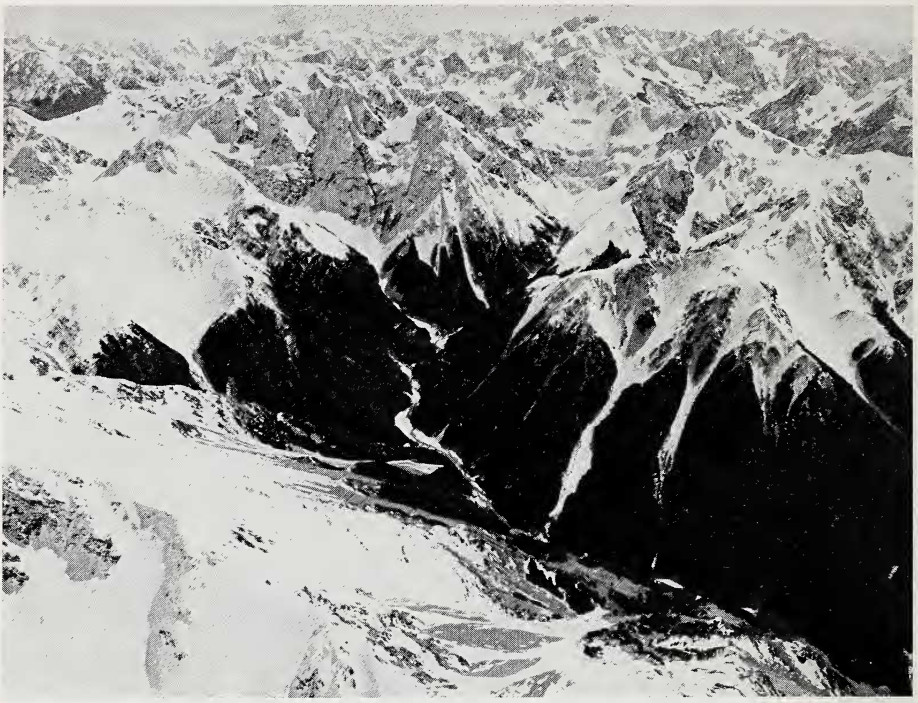

Fig. 2. View over Basin Creek in late winter

Fig. 3. Self-attaching collar for chamois, showing polythene rope collar with tags attached, snap-lock clip and ring, and a section of the snare cord. — *Fig. 4.* A 1-year-old chamois marked with a self-attaching collar

Materials and methods

Self-attaching collars used to mark chamois (Fig. 3) were previously developed to tag red deer in the north of the South Island (Taylor 1969). Similar devices were first used by Romanov (1956) to mark a variety of Russian game, and later adapted by other workers to mark white-tailed deer *(Odocoileus virginianus)* (Verme 1962), red deer (Ahlen 1965), and cotton tail rabbits *(Sylvilagus floridanus)* (Keith 1965).

Self-attaching collars are neck snares that fasten an interlocking collar around an animal's neck; the animal then frees itself by breaking the anchoring cord. Each snare comprises a stainless steel snap-lock clip and sliding ring, a 60-cm length of hollow braided-polythene rope (8 mm diameter), and a 3- to 5-m length of hollow braided-polythene cord (3 mm diameter and about 55 kg breaking strain when intact). Collars for chamois were adjusted to an optimum circumference of approximately 40 cm. Details of the materials and the methods of assembly are given by Taylor (1969).

To permit visual identification brightly coloured PVC-coated nylon tags, about 15 cm long and 4 cm wide, were attached to the collar braid. Collars were colour-coded with from one to four tags from a selection of 10 colours (red, yellow, green, black, pink, mauve, dark blue, light blue, silver, and white). However, only about half the colours were used in association with one another since similar shades were often indistinguishable at a distance. The clip, being the heavier part of the collar, normally lies below the neck, so the tags could be positioned on the collar accordingly. Tags were variously arranged on the collar to appear at the top, side, and bottom of the animal's neck. Different-coloured collar ropes were used to supplement the tags and distinguish between groups of snares at separate locations. In addition the collars were fitted with an addressed aluminium band and serial numbers were stamped on the clips.

Snares were set on trails and ledges, either aggregated in groups or dispersed along negotiable routes. Each separate group of snares was termed a line. Snares were set in forest,

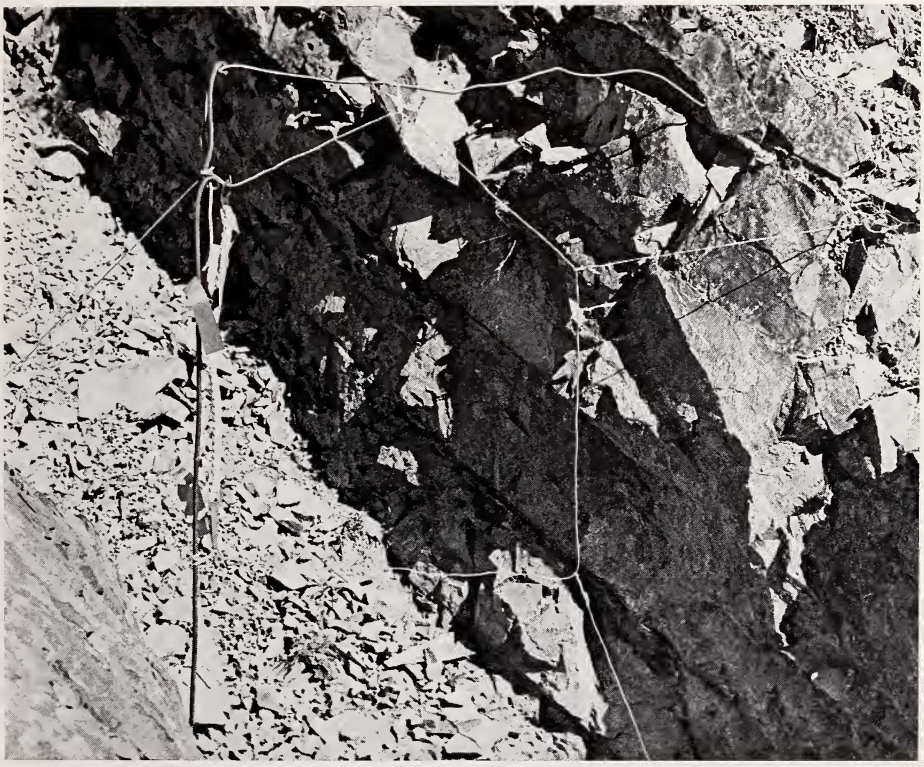

Fig. 5. Chamois snare set, illustrating collar and trace, supported by reinforcing rod upright, overhead wire and tie-tabs

timberline scrub, alpine grasslands, and grasslands bluffs, but most were set in partially forested bluffs near the timberline since these bluffs, provide shelter, refuge, and feeding sites for chamois. They are also usually inaccessible to the red deer of the region.

To facilitate the setting of snares in steep, exposed sites, various aids were required. Two-metre lengths of steel rod (about 1 cm diameter) were used as vertical supports to position the collar and the trace that formed the snare loop (Fig. 5). The rods were bent to produce two "eyes" spaced about 10 cm apart, at one end.

Galvanised steel wire (No. 8 gauge 4 mm diameter) in 1- to 2-m lengths provided overhead support for the snare trace. Soft plastic-coated wires (tie-tabs) were used to position and support the collar and trace. The steel rot supports were inserted into the ground, or wedged in rock crevices beside the animal trail. Usually, a single support was adequate, but for sets in open grassland or scrub, supports on both sides of the trail were necessary. The galvanised wire was inserted through the "eyes" of the vertical support and bent horizontally to extend across and above the animal trail (Fig. 5).

Snares were set with the collar hanging beside the support, so that the clip hung to the bottom. A loop was shaped from the snare trace, optimally 40—50 cm wide and 50—60 cm high, with the bottom about 45 cm above the ground. The top trace was peaked to prevent the horns of a chamois from sweeping it aside. 10- to 20-cm lengths of plastic-coated wire were bent into hooks to hold the structure. These were firmly attached to the supports and bordering vegetation. Alternatively, tying points were improvised from site material and lengths of cord. The hooks lightly cradled the trace so that the snare-loop released when initially forced by an animal. The anchor cord was tied above the set, or looped through the top of the support and tied back to the nearest attachment point. The snare was completed by weakening the anchor cord; individual strands of the braid were snipped at a point about 15 cm from the clip leaving three to five strands intact, which reduced the breaking strain to 10—15 kg.

Line distribution and identity

Between 1973 and 1976, 380 self-marking snares were set in 15 lines of 15—40 snares each (Fig. 1). They were checked monthly, except in winter when some lines were inaccessible because of deep snow. Eight of the 15 lines were concentrated within a central study catchment, Basin Creek (Fig. 2), where in 1973 a study of chamois was commenced to determine individual movements, range use, and population turnover. Seven lines were in adjacent catchments 3—10 km distant; collectively these lines encircled the central study site. Snares set in Basin Creek were distinguished by a master colour specific to a line, and one to three variously positioned supplementary colours that enabled individual animals to be identified. Replacement collars had supplementary colours added or repositioned on the collar rope. Snares set in lines outside Basin Creek had a single tag tied at the top. Different colours specific to a line were used, but snares were undifferentiated within a line. The differences in method of tagging were used to save colour combinations for individual identity markings in Basin Creek and to permit tagging in outer regions so as to investigate the movements between outlying catchments and Basin Creek.

Binocular telescopes equipped with interchangeable lenses ×15, ×20, ×30, ×40 were used to locate and identify marked animals. With the ×40 lens colour combinations were decipherable in clear conditions at 4 km. Data from Basin Creek were supplemented by observations of marked animals made during frequent extensive sight surveys of surrounding areas. Additional records were derived from animals shot by hunters at distant locations.

Results and discussion

Between March 1973 and March 1977 268 collars were taken, and about 220 chamois are assumed to have been marked.

In Basin Creek 116 of 128 collars taken have been seen on 86 individuals. Twenty-

one animals (about 25 percent) were multiple markings, having two or three collars each; one animal was collared four times. Chamois marked in Basin Creek, but not accounted for by sightings of identifiable individuals are assumed to have moved out of the area. Of 13 marked chamois so far recovered from distant locations, five had not been previously sighted in the study area. Of the collars taken, slightly more than half (56 percent) were from lines in outer areas. Numbers of individuals marked could not be estimated because of the undifferentiated marking system used within lines. However, sightings of many area-marked chamois indicated that a high proportion of collars taken actually marked different individuals. Fewer multiple markings from outer area lines were sighted compared to multiple markings from the Basin Creek lines. Lines in outlying areas were more widely scattered and snares less concentrated within the line than those in Basin Creek. Twelve chamois had mixed multiple markings from Basin Creek and outside lines.

In Basin Creek an average of about 50 chamois are sighted each month, and almost half are marked. That includes an estimated 50—70 percent of animals usually resident there, and an additional number (which fluctuates seasonally) that visit the study area infrequently. Some individuals, mainly males, have been recovered up to 42 map km from where marked. Data on daily, seasonal, and home range movements of chamois will be published in a later paper.

Marking was most successful in summer (December—March) especially during wet weather. On some lines, marking success of up to 29 percent of snares set per month was achieved, although lower rates of 6 percent per month were usual. During winter, catch rates declined to about 3 percent of snares set per month, although effective rates were probably higher since many snares were buried by snow. Higher numbers tagged during June—July 1975 resulted from unusually light snow conditions, thus allowing the animals access to the snaring sites. Marking success in spring was exceptionally poor in all years.

Proportion of different age/sex classes of chamois marked in Basin Creek in summer and autumn/winter seasons 1973—77

Only animals (multiple markings included) with specific marking dates determined to within 40 days have been shown

	Adult male	Adult female	Yearling	Kid
Summer (November—March)	6	15	18	14
Autumn/Winter (April—July)	19	7	5	6

Approximately even proportions of the different age classes and of male and female animals appear to have been marked (see Table). During the summer seasons there was a predominance of adult females, yearlings, and kids marked, but in autumn/winter adult males were more frequently tagged. During the rutting season, from April to June, adult males accounted for half of the animals marked. Kids were not usually tagged until aged 2—3 months, as prior to this age their heads easily slipped through a clipped collar.

Although tags were generally durable, around 15 percent have faded or fallen off after 2—3 years. In some multiple-marked animals, the collars entangled resulted in clips riding up the side of the neck, thus confusing the colour configuration. Collars are durable and should last an animal's lifetime.

Chamois do not appear to be disturbed by collars. Occasionally, kids chewed tags that hung across the lower shoulders, but adults displayed no overt behavioural responses even when observed immediately after tagging.

A number of collars were found discarded 1—5 metres from the snare site. From half to twice as many collars were discarded each month as were subsequently confirmed as on animals, and the incidence of collar discarding has generally increased during the study period; previous encounters by chamois with the snares would explain this. The most obvious reasons for snare failure were animals being caught by the body, legs, or horns; together these causes accounted for about 75 percent of all failures. In sites usually occupied by adult males, groups of consecutive snares were frequently broken down and collars found discarded nearby. Observations of animals leaping at snares on narrow bluff trails suggested that some individuals were alerted and alarmed by snares, in particular those that obstructed access.

Causes for failure of a collar were usually indicated by careful examination of the set and discarded collar. On 1—2 percent of occasions the sliding ring jammed on the clip, damaging the clip, and allowing the anchor cord to break prematurely. Catches by the legs and horns typically resulted in the collar closing, and then being shed a few metres away. When the animal was snared by the body ,the collar remained unclipped and there were indications of a struggle having occurred (viz. hair entwined in the cord and damage to set). In addition the cord broke where it tightened around the animal's body, or on an object, and not at the weakened point. Collars were recorded as taken only when the cord broke at the weakened point and thorough checks in the vicinity of the set failed to locate the collar. Rarely were collars found discarded far from the snare site.

Winds and snow also diminished the rate of tagging success. During gales, snare traces and collars were detached from the supports or fouled by wind-blown debris at exposed sites. In winter, many sets were inundated by snow, or swept away in avalanches. In addition, mountain parrots [kea *(Nestor notabilis)*] frequently damaged or destroyed collars and tags, and red deer and opossums *(Trichosurus vulpecula)* also occasionally disturbed the sets.

Eleven chamois have been strangled by snares. Significantly, this occurred in late spring and early summer when chamois were in poor condition after the winter and were not able to break the anchor cord; all were juveniles.

In winter there are generally fewer opportunities to mark chamois within the study area than during the summer and autumn seasons. However, some animals are usually tagged, for food supplies are then restricted and chamois concentrate in the bluffs where snares are situated.

During summer, increased movement by chamois, compared with that of winter months results in more frequent contact with snares. Also, the transient passage of many animals through the study area further enhances the rate of marking success. In Basin Creek the numbers of transient "visitor" animals recently tagged, now increasingly exceeds the number of resident-class animals being marked. This reflects the high proportion of resident animals already marked. It also reinforces the belief that animals which presumably have not encountered snares are more vulnerable to being marked than those that frequently encounter snares.

These preliminary results demonstrate the effectiveness of self-attaching collars for marking chamois, especially as used to exploit the animal's preference for steep mountain terrain. Snares set in lairs, ledges, and bluff sites have contributed appreciably to marking success.

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Zusammenfassung

Halsbandmarkierungen von Gemsen in Neuseeland

In der Zeit zwischen 1973 und 1977 konnten in den Südalpen von Neuseeland 220 Gemsen in Schlingenfallen mit Halsbändern, die sich selbsttätig anheften, versehen werden. Diese Markierungsmethode soll Einblicke in die Bestandgröße und -zusammensetzung sowie in Reviernutzung und Wechselgewohnheiten ermöglichen. Die Halsbandfallen wurden in steilem, alpinem Gelände gesetzt. Der Markierungserfolg lag monatlich zwischen 3% und 6% bezogen auf die Gesamtzahl der gestellten Fallen. Diese wurden, soweit in der Zwischenzeit ausgelöst, in monatlichem Abstand neu gestellt. Ausgewachsene Böcke wurden hauptsächlich in den Wintermonaten gezeichnet, Weibchen und Jungtiere häufiger während der Sommermonate. Der Markierungserfolg entsprach in den verschiedenen Altersgruppen und Geschlechtern deren Anteil an der Population. Er zeigte sich vom Wetter, von der Wachsamkeit der Gemsen gegenüber den Fallen und von der jahreszeitlich bedingten unterschiedlichen Besuchshäufigkeit an den Fallen beeinflußt. Gekennzeichnete Einzeltiere streiften über eine Weite bis zu 42 km Luftlinie.

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WISSENSCHAFTLICHE KURZMITTEILUNGEN

Giraffe south of the Niger-Benue river system

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In earlier papers (Happold 1969, 1973a, b), I showed that giraffes *(Giraffa camelopardalis peralta* Thomas, 1898) are rare or uncommon in many localities north of the Niger-Benue river system from about 8° — 18° N, and that they have not become established in what appears to be suitable savanna within the same latitudes south

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